Computer Graphics

The ‘book’ page will evolve!

https://www.cise.ufl.edu/research/SurfLab/gfxNotes/cap4730/CGsyllabus.html

Structure of the course:

- Polyhedra (2 variables, linear)
- Curves (1 variable, curved)
- Surfaces (2 variables, curved)

https://www.cise.ufl.edu/research/SurfLab/gfxNotes/cap4730idx

Computer Graphics

https://www.cise.ufl.edu/research/SurfLab/gfxNotes/cap5705idx

https://www.cise.ufl.edu/research/SurfLab/gfxNotes/cap5705/CGsyllabus.html

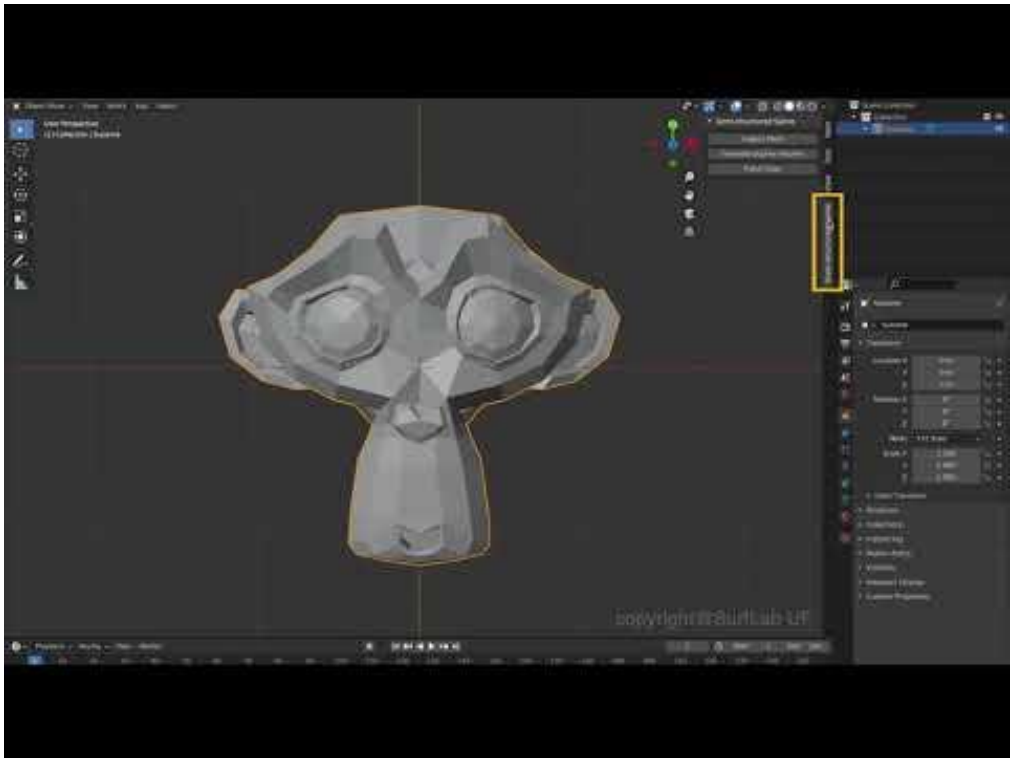
This syllabus page will evolve!

Structure of the course:

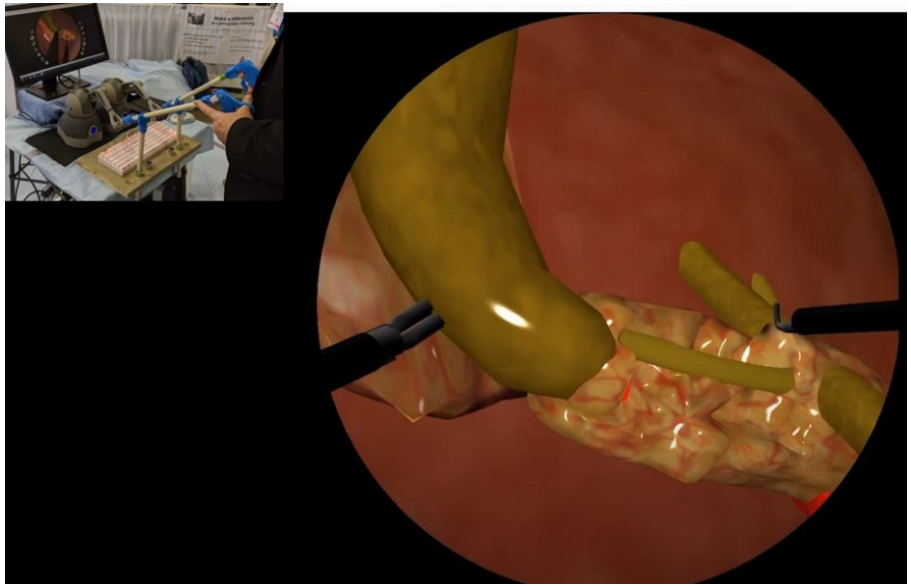
- Curves (1 variable)
- Polyhedra (2 variables, linear)
- Surfaces (2 variables, curved)

Cool tools (not covered, but lightly used)

Blender



not covered, interactive simulation

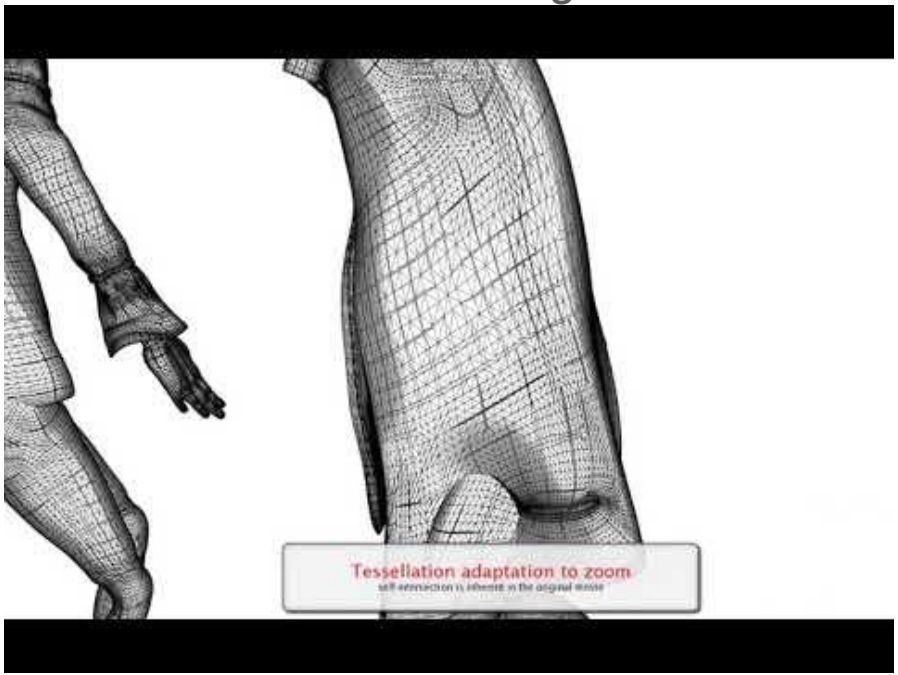


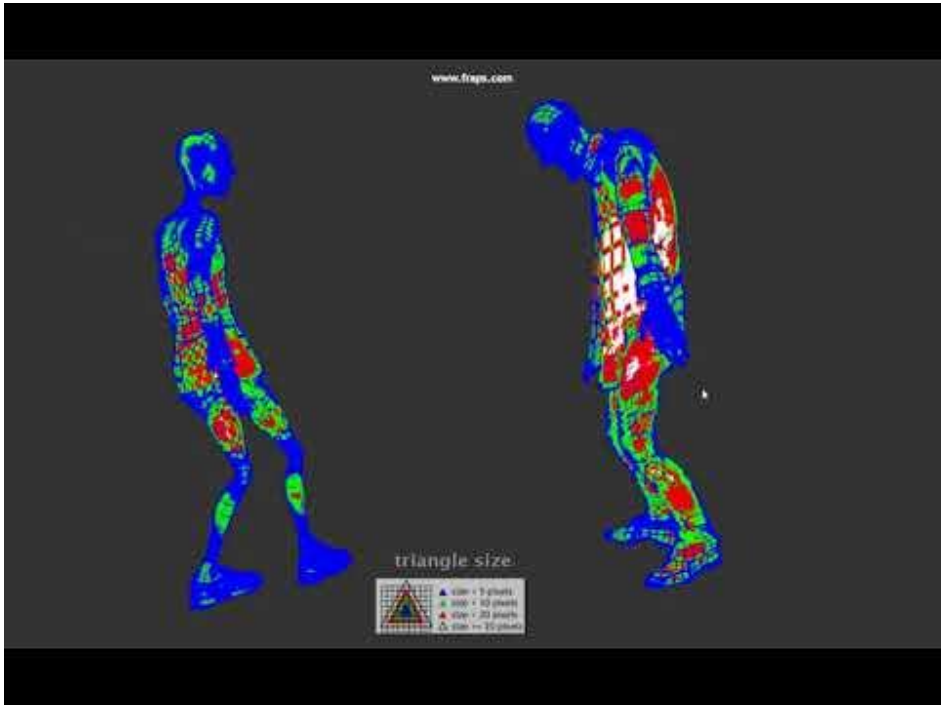
Surgical simulation

Min 1:03

Not covered: Animation, rigging,...

Tessellation Engine

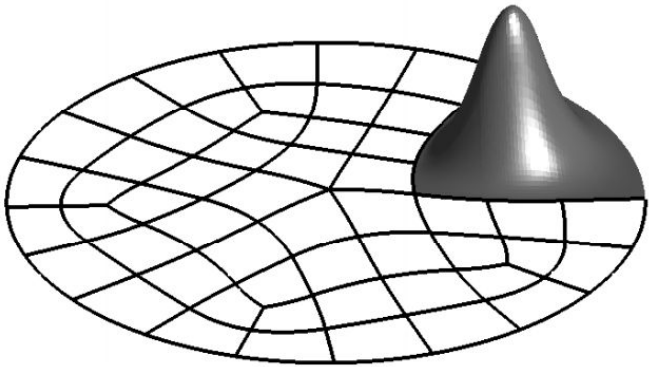


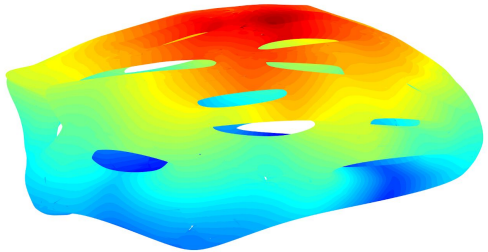


Efficient Pixel-accurate Rendering of Animated Curved Surfaces [YBP12]

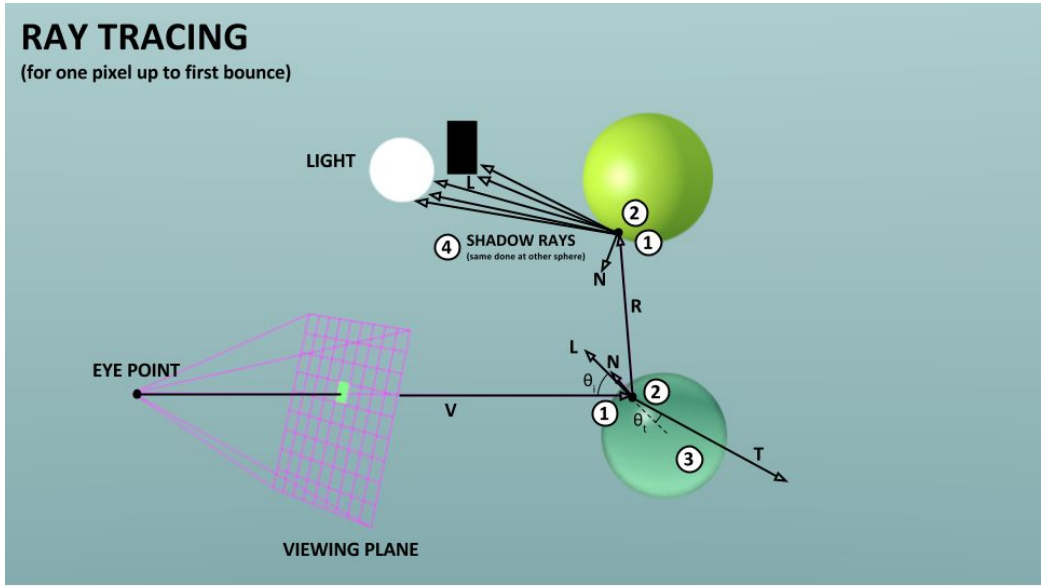
Elephant's Dream Blender

Not covered: Design & engineering analysis





not a focus: Ray Tracing



① Sphere equation: $(\vec{p}-\vec{c})\cdot(\vec{p}-\vec{c})=r^2$

Ray equation: $\vec{r}(t)=\vec{o}+t\vec{d}$

Intersection:

$$\left(\vec{o}+t\vec{d}-\vec{c}\right)\cdot\left(\vec{o}+t\vec{d}-\vec{c}\right)=r^2$$

$$t^2\left(\vec{d}\cdot\vec{d}\right)+2\left(\vec{o}-\vec{c}\right)t\vec{d}+\left(\vec{o}-\vec{c}\right)\cdot\left(\vec{o}-\vec{c}\right)-r^2=0$$